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ABSTRACT

Based on the research report "Thinking Skills" by Robert J. Marzano and C. L. Hutchins, this paper offers the following pointers on teaching children to think: (1) when teaching new information, have students compare it with what they already know; (2) provide students with manageable ways to evaluate information and teach them to ask questions; (3) help students develop a good problem-solving framework; (4) use "guided imagery," a technique that involves imagining an event or experience, to teach children important or difficult information; (5) teach children to elaborate by making inferences about information not explicitly stated in what they read; (6) encourage invention by asking students to create new information or products; (7) make sure students know how to use instruments such as a microscope or a map; and (8) encourage students to set goals for particular time frames. Examples of each pointer are included. It is suggested that educators teach students how to choose the information they want to remember and that students learn to examine their attitudes about learning and to evaluate their own progress. (JD)

Research in Brief

Chester E. Finn, Jr., Assistant Secretary

William J. Bennett, Secretary

Eight Pointers on Teaching Children to Think

It isn't easy to teach children to think. And they're not always eager to learn

Even so, many teachers now wrap instruction on thinking around everyday lessons. They know how important it is for all youngsters to become competent thinkers -- able to analyze facts, solve problems, and defend opinions.

Some pointers on teaching such skills are offered in a report, *Thinking Skills*, by the Mid-Continent Regional Educational Laboratory, which is funded by the Office of Educational Research and Improvement (OERI). The report, by Robert J. Marzano and C.L. Hutchins, is based on their research and that of many other scholars.

From that report come eight pointers for teachers:

• When teaching new information, have students compare it with information they already know. "Matching," as it's called, can help preschoolers learn words or college students absorb history. One kind of matching is to categorize items according to their features. For example, preschoolers would categorize such words as "duck," "bird," and "hen." College students might categorize wartime figures such as Hitler and Napoleon according to personality traits. Similarly, students can cluster information according to relationships or links that connect them. They learn to identify various links among words ("Horse is to lion as blue is to pink" or "Mountain is to hill as tiger is to housecat", and then find the links between sentences, paragraphs, and within the text as a whole.

• Give students a manageable way to evaluate information. (Researchers call this "critical thinking.") Teach students to ask four questions about a statement: (1) Is it unusual? (2) Is it common knowledge (e.g., "the sky is sometimes blue")? (3) If it isn't, what is the proof? (4) If there is proof, is it reliable? If the answer to 4 is "no," then the statement is unsubstantiated.

• Help students develop a good problem-solving framework. Remind them that good problem-solvers attack problems systematically, not haphazardly. And while it's best for children to adapt a framework to their own style, a typical one helps children to (1) understand the problem, (2) design a plan to solve it, (3) carry out the plan, and (4) decide whether the plan worked. In the first step -- understanding the problem -- the student must identify what is known, what is unknown, and the operations to be performed. (A sample problem: "A train can travel 10 miles in 4 minutes. How far will it travel in 14 minutes?" In this problem, the missing information is a simple formula *rate x time = distance* If the student has the formula, he or she can work the problem) This first step can be difficult because there are many types of unknowns, and a student who knows only one type may apply the wrong formula For example, he or she might know only the *rate x time = distance* formula and try to apply it to all problems. It's important for teachers to carefully identify types of unknowns and group problems by those types.

• Use "guided imagery" to teach children important or hard-to-grasp information. This technique involves imagining an event or experience. (This is a powerful technique in sports training -- athletes mentally imagine the feat they are to perform.) But imagery is more than positive self-talk and should not stop with "pictures in the mind." The imagery should include touching, seeing, hearing, and feeling because these sensory images help store information in long-term memory. For example, children studying the Sahara Desert might be asked to "see" the desert, "touch" the sand, "hear" the wind whistling, and "feel" hot and thirsty.

• Teach children to elaborate. Have them make inferences about information that was not explicitly stated in the text. You can frame questions or make assignments that require students to elaborate on what they have read. ("Let's use our imagination. Let's picture the soldiers at Valley Forge. How did they feel? What were they wearing? Imagine you are one of those soldiers and write a letter to your family.")

• Encourage invention. Ask students to create new information or products. (Geography students studying the Sahara Desert might create a table-top model of a desert oasis using sand, water, leaves, and twigs. Science students could plan and design gadgets for doing their household tasks, from watering plants to feeding pets.) Invention, of course, includes writing, one of the premier thinking skills, which can be made part of every other subject from reading to geography to social science. (Geography students might be asked to pretend they are wheat-growers in Kansas or citrus-growers

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in Florida and to write advertisements about their crops.) When asking students to invent something -- whether it's writing a story or drawing a picture -- allow some time for them to think about their creation and, after they've created it, to polish and revise it.

- Make sure students know how to use a procedure -- and when. Science students must learn how to set up a microscope and use it properly. Geography students should learn how to read a map. Math students must know which procedures work for specific problems and which do not. In reading, students should learn how to summarize, paraphrase, and locate central ideas.

- Encourage students to set goals, stating what they should achieve within a time frame. This allows them to learn faster and can give them a sense of accomplishment. Encourage students to put goals in writing, to constantly imagine themselves meeting the goals, and to review and update their goals occasionally.

It's also important to teach students how to pick and choose the information they need, or want, to remember. In other words, help them become accustomed to finding the most significant ideas or concepts in what they read. They can't possibly absorb all the information available at any one time. But if they're picky, they can store information more effectively and recall it when they need it -- vital to reasoning and comprehending.

Finally, students should learn to examine their attitudes about learning and evaluate their progress. They should identify what is working for them and what isn't. This is easier if they set small goals -- checkpoints -- on their way to a larger goal.

-- Laurie Maxwell, Writer
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Thinking Skills: A Conceptual Framework, by Dr. Robert J. Marzano and Dr. C. L. Hutchins, may be ordered from the OERI-funded ERIC (Educational Resources Information Center) in microfiche ($.78) or hard copy ($5.55 plus postage). To get the cost of postage, call 800-227-3742 (in Virginia, 703-823-0500) and cite ED #266436. The report is also available for $6.95 from the Mid-Continent Regional Educational Laboratory, 12500 East Iliff, Aurora, CO 80014.

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